

C-O-P-Y

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TO: Chief, Operations & Training Division, OC

23 October 1956

FROM: Chief, Engineering Division OC

SUBJECT: General - Conference Report
Specific - Allocation of ASF-4 Equipment

25X1 1. During a conference on the ASF-4 equipment on 11 September 1956, [] outlined to [] (Chief, OC-O&T) a proposed allocation of ASF-4 equipment, and discussed installation and training problems. It was decided that the ASF-4 equipment will be placed as follows:

- a. System 1 transmitter at [] and receiver at []
- b. System 2 to be GFE to [] for further development in connection with RD-103, Task Order 3.
- c. System 3 transmitter at [] and receiver at [] to make this a two-way link.
- d. System 4 transmitter and receiver at []
- e. System 2 upon completion of development work under RD-103, Task Order 3 will be installed in the Far East.

25X1 2. It was decided that a training course be established by the Research and Development Branch to provide ASF-4 training for installation, maintenance, training and operating personnel. Following this initial course the training of additional operating and maintenance personnel will be the responsibility of the O&T Division; a selected [] instructor will be trained in the ASF-4 equipment course conducted by R&D. In addition, it was agreed that the R&D engineer assigned to make the initial installation at [] will be responsible for training maintenance and operating personnel in that area while TDY there.

3. The estimated delivery dates of the equipments are as follows:

- a. System 1, the refurbished prototype, 1 November 1956.
- b. System 2 to be GFE to [] 1 April 1957.
- c. System 3, 1 May 1957.
- d. System 4, 1 June 1957.

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APPROVAL:

25X1

25 YEAR RE-REVIEW

S E C R E T

VISUAL RADIO TELETYPE READ OUT UNIT PERMITTING A NEW COMMUNICATION CONCEPT

The purpose of this invention is to provide a means and method whereby non-technical personnel may read and copy teletype transmissions on a visual read out basis.

The invention will permit wider dissemination of such vital information as meteorological broadcasts and other communication services which are now restricted to those terminals which are equipped with standard teletype equipments. The invention provides a new communication concept.

In its simplest form the unit would receive normal radio teletype transmissions in their normal neutral (on-off) or frequency shift (FSK) binary form and present this information through appropriate sequence matrix and gates to a beam switching tube, the beam switching tube will activate a gas filled, cold cathode indicator tube which (for the numerals 1 through 0) may be exemplified by the Haydu HB-106 indicator tube.

The visual read out speed of the indicator tube is limited as applied to this concept only by the visual acuity of the receiving operator. The maximum achievable speed should not be less than that established by high speed radio operators in the transcription of inked (undulator) recordings.

In its simplest form no necessity exists to utilize the maximum read out speed which may be achieved or to require special transmitting equipments to permit exceptionally low speed transmissions.

Briefly the communication system can be established in many distinct manners -- two of which are:

- (a) From a view point of maximum efficiency and from generally accepted station operating conditions it is dictated that the transmissions be machine sent. This can be accomplished by preparing the message tape on an appropriate perforator unit and transmitting it by means of a standard transmitter-distributor unit. Where direct read out is desired at a character rate desired by the receiving operator, the individual characters are transmitted by the sender at the normal character speed established at the transmitting station (60 or 100 wpm) but the time intervals between individual characters will be arranged to conform to the speed desired. At the receiving read out terminal the beam switching selector is arranged to perform at standard character transmission rate but time constants are incorporated in the indicator readout tube so as to hold the indicator in its "on" condition for a greater period. This overlap of one character with that transmitted in immediate sequence. The number of characters transmitted per minute can readily be controlled by establishing the transmitter-distributor start solenoid on a single character basis and by means of a simple timing circuit can be established at any desired rate for automatic transmission.

- (b) The system is such that if it is so desired the receiving terminal may be equipped with a (dual) speed recorder. In this arrangement the transmission is made by the transmitting station at its normal 60 or 100 wpm rates and the resultant audio output at the receiving site is recorded at the high speed rate. This in turn is played back from the recorder through the matrix, beam switching tube and the indicator tube. This speed would be consistent with that of the operator. It is noted that in this mode the played out characters will be in normal sequence without special spacings between characters. Under this mode the readout unit will be arranged on a character sequence basis with indicator duration being established as the same duration as being encountered in the playback of the individual characters.

The system concept as established affords certain economic advantages and potential miniaturization over existing systems. It affords a major reduction in technical training and equipments necessary to read teletype transmissions. It can be arranged to permit incorporation into existing communication services with a minimum of alterations to existing station equipments or current operating modes. It provides a means of greatly increasing the use of existing technical broadcasts such as meteorological reports. It can be utilized in airborne, maritime and other mobile portable services where weight or power factors may preclude the use of existing equipments.

At this time, the most readily available read out tube is one which is currently arranged to display the numerals 1 through 0. However, no technical features preclude this type of tube being arranged for alphabetical display or for such special symbols as may be desired for special applications.

Through the utilization of an International Morse Code to Binary translator applique unit the system can be adapted to permit visual display in numerical and literal form of material transmitted in Morse Code.

The system may be applied to when desired, those transmissions contained on wire lines, cable audio frequency carrier, infra-red and other light transmission systems.

Weather broadcasts where the normal message transmission sequence is figure function key, figure etc would result in an actual transmission speed (on standard 60 wpm circuits) which would be compatible with both fixed station teletype reception and visual readout stations, by an airplane radio operator for example.

For some applications it may be desired to replace the visual readout indicator with solenoid actuated typewriters or printing adding machine devices. These units can be controlled by the beam switching tube.

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9 October 1956

Witnessed:

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SECRET**KEYBOARD MORSE KEYS**


1. It is felt that the present state of the art permits the development of a semi-automatic keyer to transmit pre-formed Morse characters from a keyboard. Use of such a device on an agent circuit would allow an operator to transmit clean, accurate Morse characters without the months of training now required to develop a readable fist. A larger model could be used by experienced "typists" to handle staff traffic at speeds up to 60 wpm. It is with the agent-size unit that this discussion is concerned.

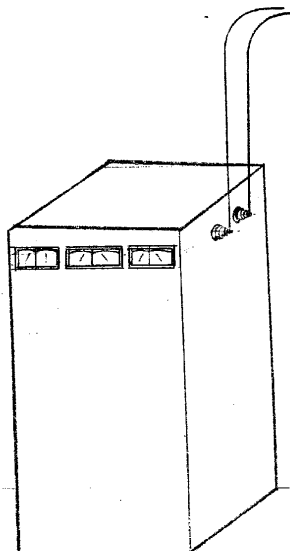
25X1 2. A [] Morse typewriter evaluated at the R&D Laboratory last year was described in the Lab report as producing characters comparable to those from a Boehme head. However it weighed about 15 lbs, required a 6-volt DC source for a continuously-running motor, and produced objectionable rf hash. It had a large number of relays and was quite noisy in operation. It is submitted that a much simpler device, entirely mechanical, could be developed which would fill the need for a keyboard-actuated keyer without sacrificing the weight and power considerations paramount in agent operation.

25X1 3. The device envisioned herein is small - about 4"x5"x8" - with a sloping top exhibiting a forty-button keyboard. It produces Morse letters, numbers and punctuation marks by means of rotating cams and wiping contacts, or by a key stroke system, depending upon which method further investigation indicates as being the more feasible. It has no vacuum tubes or relays and should require less maintenance than any other component of an agent's gear. It is completely self-contained and does not draw power from the transmitter or its supply. Unlike the [] keyer or RS-13 transmission system, it has no storage characteristics and can be used with any transmitter in place of a telegraph key, and with normal break in operation. There is no re-supply problem of batteries, tape, etc. in connection with its use. If an ordinary key-click filter is incorporated into its design, there should be no objectionable r.f. interference of any kind.

*Build 1 10 digit coder on time-available-basis
to see how it works.*

SECRET

<u>MANUFACTURER</u>	<u>MODEL</u>	<u>COST</u>	<u>AVAILABILITY</u>	<u>DESCRIPTION</u>
	4310-1	\$11,840.00	5 months delivery	10 Auto tune controlled frequency channels. 2 to 30 mcs. Phone/CW/FSK with a power output of 1,000 watts. Provision for crystal control, FSK, or external excitation. Power requirements; 208/230 vac. single phase 50/60 cyps. 84"H, 48"W, 33"D. Weight 1,200 lbs.
	RT-4	2,317.69	Agency Warehouse	<u>Frequency range</u> ; 4 to 25 mcs. Power output; 500 watts. Type of emission; CW only power requirements; 115/230 vac single phase, 50/60 cy. @ 1.55 kw. <u>Physical</u> ; two cabinet type, rack mounting (its One power supply w/variatic, one power amplifier, RF. Four bands. VFO or FSK input may be had by connecting an external exciter unit to a jack provided in rear of power amplifier. Continues tuning final with antenna coupler, built-in. Crystal controlled.



COMMUNICATION KEYS

The following invention covers a means for the generation of keying signals which may be employed to key existing radio transmitters, wire circuits or training devices. The unit is arranged for keyboard operation.

The unit may be employed, dependent upon the key shuttle units used, for the generation of Morse code or teletype binary key elements.

The unit is arranged for standard keyboard arrangement in the following manner. Upon the depression of a key lever a code shuttle is moved along a pre formed guide chamber guides, as the shuttle is moved it compresses an actuating spring and simultaneously positions a dash pot extension rod. At a designated point in the shuttle's rearward travel, tension springs located in the bottom of the shuttle chamber cause the shuttle to rise into appropriate guide channels, at this point the shuttle is released from the rearward motion effected by the depression of the keylever and is transferred to the energy obtained through the compression of the actuating spring. The shuttle is moved by the actuating spring and is caused to come in contact with the fixed keyer contact, the speed of the shuttle travel is controlled by the dashpot unit as established for the operating keying speed desired (friction retard methods may also be employed if desired). The portion of the shuttle coming in contact with the keying contact is arranged in accordance with the signal code to be transmitted, each dot and dash being arranged on the appropriate baud basis for the individual character to be transmitted, or arranged on the appropriate mark and space combinations as established for the particular teletype code to be transmitted.

When teletype type signals are transmitted an additional control is incorporated within the dash pot unit so as to provide a return of the transmitter or line to a marking condition at the end of the character transmission thus providing a mark stop signal. Neutral teletype signals can be formed from a single contact surface arrangement of the code shuttle units. However, FSK transmissions are best accomplished by utilizing a dual contact arrangement in which one side contains the space component and the other side contains the mark element. The two bars are formed as a single unit to the insulating material contained between the two bars. Likewise this dual bar arrangement may be used in conjunction with existing Morse code electronic keying units where a maximum of uniformity of transmission word spacing is required and which is obtainable from the memory banks of the electronic keyer unit.

25X1

8 October 1956

Witnessed:

	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>COST</u>	<u>AVAILABILITY</u>	<u>DESCRIPTION</u>
25X1		GPT-750	\$3927.00	90 days in quantity	A-1 and A-3 type of emission. 750 watt maximum output. 2 to 32 mcs frequency range. 8 bands 3 channels. Crystal and master oscillator frequency control. Power requirements; 115/230vac 50/60 cy. single phase, 2100 watts. Cabinet contained, 46"h, 34"w, 27"d. Output, co-axial 50 to 150 ohms. (This has been extended to 1,000 ohms) (with a factory modification).
	Signal Corps	T-368	\$3300.10	"Off the shelf item"	A-1, A-2, A-3, F-1, and F-3 type of emission, 400 watts output maximum AM. 450 watts output maximum CW. 1.5 to 20.0 MCS frequency range. 5 channels, master oscillator frequency control. Power requirements; 115 vac, 50/60 cy. single phase. Cabinet contained, components mounted on separate pullout drawers. 41"h, 32"W, 31"D.
25X1		HF-1M	\$5,950 \$4,950 \$3,950	120 to 160 days 120 to 160 days	25X1 HF-1M; 1,000 watts output. 2 to 32Mcs output. 3 to 32 mcs output can be controlled from front panel. 49/73 ohms unbalanced output. 10 crystal position. 230 vac. single phase 50/60 cy. CW and AM. FSK and 400 wpm CW can be added. 4 R.F. stages.
	Signal Corps	T-276/UR	NONE/NAVAL	NONE/NAVAL	A 500 watt exciter-transmitter which can be used as a low power transmitter or as an exciter for a linear amplifier. Will be designed for use with a 5 kw linear amplifier called the OA-252.

Type	Speed (WPM)	Capacity (GR)	Storage Medium	Reusable	Transmission Time (Min)	Type of Signal	Method of Coding	Power Requirements
UGT-1	10+60	100	Punched Magnetic tape	no	10+2	Morse	1	spring-wound motor 60-270 volts AC
ET-2	60	150	Magnetic tape	yes	2 $\frac{1}{2}$	Baudot	Keyboard	40-400 cps
	40**	-	Paper tape	no	-	Morse	Punched CW	hand-pulled tape
Telephone Dial *	12	-	none	-	-	Pulses	Dial	spring return
Project 2633	20	-	none	-	-	Morse-Baudot	Keyboard	spring-wound motor
	15+150**	100	35 mm film	no	6-45 sec	Morse	Keyboard	hand-crank
RB-13	300	150	paper tape	once	30 sec	Morse	Pencil-mark paper tape	12-volt motor
RS-16	1600	50	Magnetic tape	yes	2 sec	Pulses	1	spring-wound motor
RS-18	1250	50	Magnetic drum	yes	2 $\frac{1}{2}$ sec	Pulses	1	spring-wound motor
AS-3	300	125	Magnetic tape	yes	25 sec	Morse	Punched CW	12-volt motor
	200**	100	Magnetic tape	yes	30 sec	Morse	Hand-sent Morse	110,220 vac
	2250	56	Paper roll	no	1 sec	Pulses	Pencil-mark paper roll	undetermined
	50		Paper tape	no	-	Pulses	Write	

1 Alphabet wheel
 * Transmits digits only
 ** Depends upon operator

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Next 1 Page(s) In Document Denied